A ART 34 AMDT

New claims: What I claim is:

1. A method for detecting CDMA-coded signals $\underline{d} = (\underline{d}^{(l)}, ..., \underline{d}^{(K)})$, where $\underline{d}^{(k)} = (\underline{d}_l^{(k)}, ..., \underline{d}_M^{(k)})$, $k = 1, ..., K$, characterized in that the method comprises the following steps:

a) determining a first detection solution $\hat{\underline{d}}(1)$ of CDMA-coded signals $\underline{d}$;

b) determining an (n+1)-th detection solution $\hat{\underline{d}}(n+1)$ for n = 1, ..., N as a function of the n-th detection solution $\hat{\underline{d}}(n)$ by assigning

$$\hat{\underline{d}}(n+1) = f(\hat{\underline{d}}(n))$$

where iteration for $n \to \infty$ ~~converges~~ toward multiuser solution $\hat{\underline{d}}_{MU}$, i.e.,

$$f(\hat{\underline{d}}(n)) \xrightarrow[n\to\infty]{} \hat{\underline{d}}_{MU},$$

c) if the quality of approximation solution $\hat{\underline{d}}(n+1)$ is not sufficient, assigning $n \to n+1$ and continuing the procedure with step b);

d) if the quality of solution $\hat{\underline{d}}(n+1)$ is sufficient, terminating the procedure and using $\hat{\underline{d}}(n+1)$ as the estimate of data $\underline{d}$ to be detected,

e) the function of step b is given by

$$f(\hat{\underline{d}}) = \hat{\underline{d}} + \delta \cdot \underline{g}$$

with

$$\delta = \frac{\|\underline{g}\|^2}{\|A \cdot \underline{g}\|^2} \text{ and } \underline{g}^T = A^H \cdot (\underline{s}^T - A \cdot \hat{\underline{d}}^T)$$

where matrix A is given by

$$A = \begin{bmatrix} b^{(1)}{}_1 & 0 & \cdots & \\ \vdots & \vdots & & \\ b^{(1))}{}_Q & 0 & & \vdots \\ \vdots & b^{(1)}{}_1 & & \\ b^{(1)}{}_{Q+W-1} & \vdots & & 0 \\ 0 & b^{(1)}{}_{Q+W-1} & & b^{(K)}{}_1 \\ \vdots & \vdots & & \vdots \\ 0 & 0 & \cdots & b^{(k)}{}_{Q+W-1} \end{bmatrix}$$

with $\underline{b}^{(k)} = \underline{c}^{(k)} * \underline{h}^{(k)}$,

where $\underline{c}^{(k)}$ denotes the K different codes and $\underline{h}^{(k)}$ denotes the pulse responses of the K different linear transmission channels.

2. The method according to Claim 1,
characterized in that the method converges toward the solution of the zero forcing block linear estimator for $n \rightarrow \infty$.

3. The method according to one of the preceding claims, characterized in that symbols $d^{(k)}$ to be transmitted assume values of $\pm$ 1 or $\pm$ i.

4. The method according to one of the preceding claims, characterized in that solution $\hat{\underline{d}}^T(n) = A^H \cdot \underline{s}^T$ of the RAKE receiver is used as the 1-st detection solution for starting the iteration.

5. The method according to one of Claims 1 through 3, characterized in that the first detection solution for starting the iteration is set to zero.

6. A device for carrying out the method according to one of Claims 1 through 5, characterized in that the device has a data estimator (4) for determining a first detection solution, an estimate improver (5) for determining an improved detection solution and a decision circuit (6) for deciding whether to continue the iteration.

7. The device according to Claim 6, characterized in that the estimate improver (5) has a unit (9) for calculating an estimated transmission signal, a unit (11) for calculating standardized approximation term $\delta \cdot \underline{g}$ and an adder (15) for calculating the improved estimate.

8. The device according to Claim 7, characterized in that the unit (11) for calculating standardized approximation term $\delta \cdot \underline{g}$ has a unit (12) for calculating approximation term $\underline{g}$, a unit (13) for calculating standardization factor δ and a multiplier (14) for calculating the standardized approximation term.

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